

## CONCERNING SOME INSECTS COLLECTED AND BRED FROM DEAD AND DYING ELM.

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I N response to a request written by a citizen of Lawrence, Kan., under date of September 23, 1904, and desiring information in regard to means of checking the attacks of insects boring in elm trees, I was led to make a personal inspection of the affected trees in order to ascertain the species and prevalence of the pests and extent of injuries committed by them. During the course of my observations a number of associated insects, including useful parasites, were found, and a report of them is herewith presented in connection with my remarks upon the destructive borers. The place which I visited comprised several acres of lawn and grounds in a residential section of the city. A dozen or perhaps fifteen fine shade elms were found stricken, some of them being already dead and others showing the yellow leaf a month or more too early. The case was not isolated, as other elm trees in the neighborhood were suffering in the same manner. The trees ranged in age from growths of ten years up to probably twenty years, and, on account of the long time required for elm trees to grow into prime condition, the owner was particularly desirous of saving them, if possible, or at least to prevent further loss among his healthy trees.

The larvæ of two kinds of borers, *Saperda tridentata* and *Magdalis armicollis*, were the principal enemies found attacking such trees as were almost dead. After an elm tree is once attacked by these borers, all efforts to save it appear useless on account of the difficulty in detecting and removing the grubs at work in the trunk and branches, and if the tree is not cut and burned clear to the roots in proper time it becomes a favorite breeding-place for the pests, which mature as beetles and emerge in the spring months, then endangering other trees in the vicinity, where the insects are liable to spread. The most practical method of combating elm-borers, then, is to follow Prof. S. A. Forbes's advice, as given in his third report on the injurious insects of Illinois, in which publication he says, with reference to *Saperda tridentata*: "The only remedy available is unquestionably the destruction of

afflicted trees in autumn and winter before the beetles have a chance to emerge from the trunks."

There seems to be no indication or evidence whatever that the above-mentioned borers had attacked perfectly healthy trees, but rather those which had begun to die from some unknown cause. An examination of several trees which exhibited the first signs of dying, denoted by a premature shedding of the leaves, proved them to be entirely sound, and, with one exception, failed to reveal the least trace of any insect at work in them. This one exception pertained to an older tree from which *Tremex columba* and a larva of *Chrysobothris femorata* were removed, but the presence of these specimens could only be regarded as an incidental matter having nothing to do with the primary cause of the tree's failure in health. In no instance could the responsibility for the original trouble be charged to the elm-borer, *Saperda tridentata*, or its companion, *Magdalis armicollis*, both of which, however, infested diseased trees of long standing. That the first stages in the dying of the trees, in whole or in part, as shown by the wilting and falling of the leaves before the usual time, were due to some disease, was consequently inferred. If such trees are allowed to stand in this enfeebled condition, they invite the attacks of borers as mentioned, and their complete death would eventually result. Nevertheless, the claim is made by eminent authorities that the elm *Saperda* will attack healthy trees.

The particulars concerning the different species of insects secured from dead and dying elm during the progress of my investigation as stated are herewith embodied, with a list of determinations.

#### ATTACKING THE TRUNK.

*Saperda tridentata* Olivier. (The common elm-tree borer.) Numerous larvæ collected September 26, 1904; adults emerged May 9 and 12, 1905, from section of tree kept in breeding cage.

*Chrysobothris femorata* LeConte. (Commonly known as the flat-headed apple-tree borer.) One larva in its burrow between bark and sapwood, at a distance of about one foot above ground, October 6, 1904; one adult emerged May 23, 1905, from section of tree kept in breeding-cage. Although elm has been mentioned in literature as a food-plant of this species, the authority for such a record appeared to be un-

certain, according to Mr. F. H. Chittenden, in his account of the insect published in Circular No. 32, Division of Entomology, United States Department of Agriculture. My records can now establish this fact concerning elm as food-plant beyond doubt.

*Tremex columba* Linne. (The pigeon *Tremex*.) One female found dead with ovipositor stuck fast in bark, September 26, 1904.

ATTACKING THE BRANCHES PREFERABLY, OCCASIONALLY THE TRUNK.

*Magdalis armicollis* Say. Numerous larvæ taken from their channels under bark, September 26, 1904; adults emerged April 5 to May 29, 1905, from sections of branches and trunk kept in breeding-cage. The tree from which the sections were cut for breeding purposes was so badly attacked by the grubs of this species that they had become established some distance down on the trunk below the branches, where they encroached on the regions tunneled by *Saperda tridentata*.

#### PARASITES.

*Melanobracon ulmicola* Viereck. Males and females flying about and alighting on bark of infested portions of tree later cut into sections for breeding purposes, September 26, 1904, the females probing with the ovipositor into cracks of the bark and holes of *Magdalis armicollis*, whose larvæ abounded beneath the bark; other specimens emerged during the following May from sections of the tree kept in breeding-cage. Regarding the naming of these parasites, Mr. H. L. Viereck, to whom a pair of specimens was submitted for study, wrote as follows: "This appears to be a new species and one that has been confused with *simplex*. I propose to call it *ulmicola*."

*Brachistes rotundiceps* Cresson. In company with *Melanobracon ulmicola*, September 26. Other specimens emerged during the following spring from April 13 to May 24, from sections of tree kept in breeding-cage.

*Spathius simillimus* Ashmead. Specimens emerged April 3 to May 29, 1905, from sections of tree kept in breeding-cage. Doctor Ashmead, who determined the species, added the following remark: "All *Spathius* are parasitic on Coleoptera."

*Haltichella ovatus* Walker. Specimen emerged in May, 1905, from section of tree kept in breeding-cage. The speci-

men was identified by Doctor Ashmead, who referred to it as follows: "The legs are missing from your specimen, but the thorax, etc., resemble the *Hockeria ovatus* Walker in my collection obtained many years ago in Florida."

PREDACEOUS ENEMY.

*Chariessa pilosa* Forster. (The hairy *Clerid*.) One adult emerged May 9, 1905, from section of tree kept in breeding-cage.

TAKEN FROM DEAD STANDING TRUNK.

The danger of leaving any dead or dying elm standing, as well as any portion lying on the ground, from one season to another, was forcibly exemplified by the riddled condition of an old standing trunk of a large elm tree. This trunk stood about fifteen feet high, the upper part of the original tree having been cut off and destroyed several years previously. As a support for climbing plants, the owner of the property had utilized the trunk for ornamental effect, but had overlooked the fact that it offered a harbor for borers and other insects of a more or less objectionable nature. In spots where the bark had fallen off or was stripped off from this trunk, the characteristic openings to the tunnels bored by larvæ of *Saperda tridentata* appeared in great number, thus giving evidence that the trunk had been a dangerous center for prolific breeding of the enemy. Although no borers nor fresh signs of their work were detected, the wood evidently being too far advanced in age to induce further attacks of borers, other species of insects, as indicated by the following names, were found under the loose bark or in crevices of decaying wood.

*Cremastogaster lineola* Say, subspecies *læviuscula* Mayr. Numbers of females and workers of this kind of ant, October 6, 1904.

*Ischnoptera pennsylvanica* De Geer. One immature female of this kind of roach, October 6.

*Scarites subterraneus* Fabricius, variety *substriatus* Halde-  
man. Adult, October 6.

*Brontes clubius* Fabricius. Numerous adults, October 6.

*Tenebrioides sinuata* LeConte. Adults, October 6.

*Tenebrioides castanea* Melsheimer, variety *nigrita* Horn.  
Two adults, October 6.

*Elater manipularis* Candeze. One adult, October 6; de-

terminated by Mr. H. S. Barber, of the United States National Museum. One elaterid larva also taken may perhaps belong to this species.

*Parandra brunnea* Fabricius. One dead adult, October 6.

*Nyctobates pennsylvanica* De Geer. Adults, October 6.

*Pyrochroid*. Larvæ, October 6; nearly mature, but difficult to identify the species positively.